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Stanley's Hydraulic Main.

Brooklyn, Oct. 30th, 1867.

Editors American Gas-Light Journal:

Having made an alteration of Bridge-Pipe for my Hydraulic Main, I send you a plan and desire its publication in your valuable paper. It will be seen that the Bridge-Pipe is much reduced in its length, and consequently in weight, and that one opening only is required to remove any obstruction that may occur between the mouth piece and main. It also makes it much less difficult to cast the main for this arrangement, which should reduce its cost. It is contemplated, when it is desirable to add this improvement to the old mains now in use, to cast the connecting pipes separate and bolt them to the main, having provided suitable opening for this purpose.

But my improvement, as it is well known, consists in arranging the Hydraulic Main of any desirable size or form, in a manner that gives to the gas as it rises above the fluid, a free unobstructed course in its horizontal passage through the same, and not to the particular manner which such a main may be constructed; and with your permission I propose to show by illustration, at some future time, that the mains in some of our first class gas works are obstructed to one half of their capacity, by the size and position of the dip pipe, making it necessary to place outlet pipes at different points, and connecting the same to an additional main extending the entire length of the retort house, in order to relieve the Hydraulic Main of its pressure, a difficulty entirely obviated by my improvement.

The following gas works have adopted this main, while others have arranged for its introduction next season:

Meadville (Penn.) Gas Works.
Greenburgh (N. Y.) Gas Works.
Northern (Phil.) Gas Works.
Bridgeport (Conn.) Gas Works.
Cleveland (Ohio) Gas Works.
Peoples' (Cleveland, Ohio) Gas Works.
Thompsonville (Conn.) Gas Works.
Flatbush (L. I.) Gas Works.

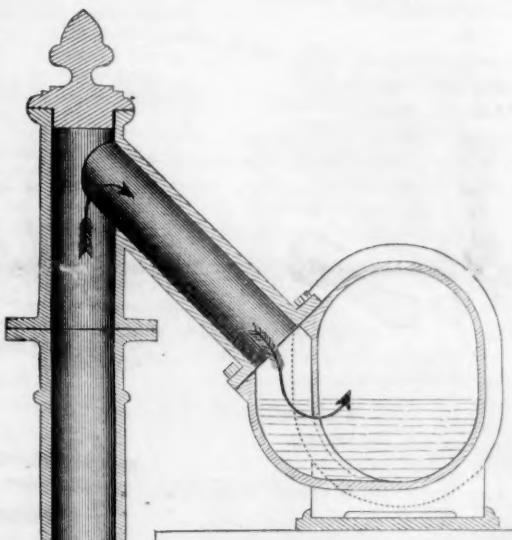
Respectfully yours,
J. N. Stanley.

—The *Irish Times* contains an announcement to the effect that patented machinery is about to be introduced into the Dublin Gas Works, whereby the work of 99 stokers will be done by eight men tending to a machine.

American Minerals at the Exposition.

A marked feature of the Paris Exposition was the Mineral Department of the United States. California, Nevada, Idaho, Colorado and Pennsylvania were remarkably well represented, and their specimens drew much attention from the scientific and thinking men of Europe who visited the Exposition.

Idaho was represented by some of the largest specimens of ruby silver ore ever found in the world. California was represented by magnificent specimens of quartz showing free gold. Nevada sent immense masses of silver-bearing rock and bars of silvery metal; but Colorado, though one of the youngest of the gold-bearing regions, probably exhibited the best representative collection at the Exposition, showing not only a number of thousand of gold and silver-bearing specimens, some of which were of immense size, weighing from 800 to 1,200 pounds, but all the varied deposits of the territory of peat, lime, salt, fire clay, coal, etc., besides all the mining maps and surveys that could be obtained; also a large number of photographs, exhibiting mining districts and towns. In addition, the Commissioner of the Territory, Mr. J. P. Whitney, distributed, in connection with the exhibition ores, over 20,000 maps of the United States and Colorado, and 15,000 pamphlets printed in English, French and German. The ores of the territory received the first gold medal of the Exposition given to minerals, while the ores of California and Nevada received second-class medals for silver.



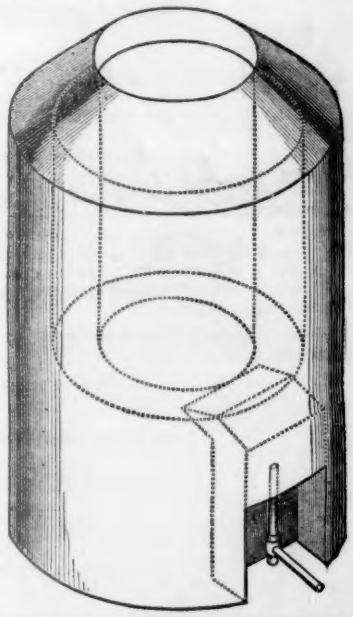
STANLEY'S HYDRAULIC MAIN.

Haskins' Patent Gas Furnace.

Rev. D. G. Haskins, Cambridge, Mass., Patentee.

This engraving represents an economical heater for dwellings on an entirely new principle.

The source of heat is common gas. The gas is burned in a funnel of proper shape, and the products of combustion are carried into a perfectly tight drum, and thence passed into the chimney without entering the apartment to be heated, thus avoiding all deleterious effects of the gas. The inner cylinder of the drum is open at the top and bottom, and is divided by several diaphragms of wire-netting. The drum thus prepared is encased in a somewhat larger cylinder, also open at the top and bottom. The air, taken either directly from the cellar or room, or brought by a pipe from without, enters at the bottom, and passes chiefly through the heated layers of wire netting, but also partly through the space between the drum and outer casing, and issues hot at the top.



HASKINS' PATENT GAS FURNACE.

The apparatus, thus constructed, can be placed under any ordinary register, or, being furnished with legs, can be used as a stove. Simple as it is, it produces astonishing results with a very small consumption of gas. It has been shown by actual experiment, that with a consumption of from five to twelve feet of gas per hour, the temperature of the issuing air may be raised from 250° to 450° Fahrenheit.

Among the advantages of this mode of heating over the ordinary coal furnace, it may be claimed that the heat is not brought from a distance, but is applied directly where it is needed; that the registers may be multiplied to any extent; that each may be used independently, and is under control in the room where it is used; that it makes no cinders nor dust; that it requires no attendance; that its first cost is trifling, and its maintenance economical; that it is simple in construction, easily managed, and not likely to get out of order.

This furnace, and other heating and cooking apparatus on the same principle, are on exhibition at Messrs. Ford & Murray's, 58 East 13th street.

State and manufacturing rights may be obtained by applying to M. L. Callender, of this Journal.

Advantages of Gas.

[From "Clegg on the Manufacture of Coal Gas."]

In the foregoing Table the comparison of the light of gas with oil and candles is made on the assumed prices for gas of 6*s.* and 7*s.* per thousand feet, which are considerably higher than those charged in most large towns in Great Britain. The ordinary cost of 13-sperm-candle gas in the metropolis is now 4*s.*; consequently, the comparative cost of gas is one-third less than is given in the Table. If the price and quality of the gas supplied in Liverpool were taken as the standard of comparison, the cost of all other means of illumination would be still more disproportionate. The quality of the gas in that town is equal to 24 sperm candles, and the price is only 3*s.* per thousand cubic feet; consequently, if 25 cubic feet of ordinary gas be equal in light-giving power to one pound of wax candles, 13½ feet of the Liverpool gas would have the same illuminating power, and the cost would be a fraction less than a halfpenny contrasted with 2*s.* 4*d.*, the price of a pound of wax candles. Dr. Letheby's report to the City Commissioners of Sewers, dated 10th May, 1852, gives the following comparative statement of the value of gas as an artificial light:

"Five cubic feet of gas give a light equal to twenty-three mould candles of six to the pound, each burning at the rate of 145 grains per hour; or that of eighteen common oil lamps, each burning the best sperm oil at the rate of 133 grains per hour; or that of 2·5 Argand lamps, burning the same oil each at the rate of 450 grains per hour; or to that of fifteen composite candles of six to the pound, each burning at the rate of 136 grains per hour. Now if we make an inquiry into the relative cost of these illuminating agents, we shall find that the facts thereof may be expressed as follows:

Gas equal to	1
Sperm oil burnt in Argand	8
Mould tallow candles of six to the pound	12
Sperm oil burnt in an open lamp	17
Sperm candles of six to the pound	24
Composition candles of six to the pound	29
Wax candles of six to the pound	30

In other words, by estimating the cost of the gas at 4*s.* per 1,000 cubic feet, the price of mould candles at 6*d.* per pound, the value of sperm oil at 8*s.* per gallon, and the price of wax, sperm and composition candles at 2*s.* per pound, it may be said that a shilling's-worth of gas will go as far in the production of light as 8*s.*-worth of sperm oil burnt in an Argand lamp, or 12*s.*-worth of ordinary mould candles, or 17*s.*-worth of sperm oil burnt in an open lamp, or 24*s.*-worth of sperm candles, or 29*s.* worth of composition candles, or 30*s.* worth of wax candles."

The relative proportions which the ordinary light-giving materials bear to 1,000 cubic feet of 13 candle gas, as estimated by Mr. Lewis Thompson, is shown in the following tabular form:

1,000 feet of common gas were found equal to the light of		44 4-7 lbs. of sperm candles.
"	"	48 6-7 lbs. carefully snuffed wax candles.
"	"	5 1-7 lbs. of stearic acid candl's
"	"	52 0-10 lbs. best mould candles.
"	"	54 3-7 lbs. of best dip candles.
"	"	6⅝ gallons of purified colza oil, specific gravity 915.
"	"	5 9 10 sperm oil, sp. gr. ·883

The comparative values of the different light-giving materials may be readily estimated from the foregoing tabular statement of relative proportions. Thus, for instance, if the cost of gas be 4*s.* 6*d.* per 1,000 feet, the cost of wax candles that yield an equal quantity of light at 2*s.* 4*d.* per pound, would be £5. 14*s.*

Since the foregoing experiments and calculations were made, the mineral oils of America have come into competition with gas, and in those places abroad where the increased cost of gas-making necessarily raises the price as high as 12*s.* or 15*s.* per 1,000 feet, petroleum may be a cheaper means of illumination than gas. It appears from experiments made in the United States by Messrs. Booth and Garnett, recorded in the "Journal of the Franklin Institute," to ascertain the relative economic values of mineral oil and gas, that where the price of 15-candle gas is 9*s.* per 1,000 feet refined petroleum is 1*s.* 9½*d.* per gallon, gas light is twice as costly as the light produced by burning mineral oil. At the same time, the experimenters observe: "It would be a partial, and perhaps culpable view of the subject, if we were to omit a notice of danger in the use of mineral oils, whether obtained from coal or petroleum." They further state: "It is not to be apprehended in the slightest degree that the oils will supersede the use of gas, especially in cities and towns, nor even in many country houses." The following table shows the value of gas as an illuminating agent, compared with petroleum:

	Material.	Quantity for an equal amount of Light.	Price of unit of quantity.	Cost of quantity for equal light.
	Gas	1000 cubic feet.	$2.25 per 1000	$ 2.25
	Petroleum	2⅝ gallons.	0.45 per gal.	1.07
Candles.	Spermaceti	37 pounds.	0.50 " lb.	18.50
Candles.	Paraffin	36½ pounds.	0.32 " lb.	11.68
Candles.	Adamantine	47 pounds.	0.25 " lb.	11.75

The magnesium light also threatens to compete with gas; but at present, neither the price at which magnesium can be manufactured, nor the modes of its combustion, make it a formidable rival. The results of a series of experiments undertaken by Dr. Frankland were recorded in vol. xiv. of the "Journal of Gas-Lighting," page 102, in which it is stated that the light produced by the combustion of 2½ ounces of magnesium is equal to that of 20 lbs. of stearine candles, and to 404 cubic feet of gas. The price of the new metal was then one guinea an ounce, and it was assumed by Dr. Frankland, that with the utmost improvements that can be made in its production, according to the only process known, of reducing it by means of sodium, it could never be sold for less than 2*s.* an ounce, at which price the light, though it would be considerably cheaper than that of candles, would still be nearly three times dearer than coal gas in London. The dazzling brilliancy of the rays of the magnesium light would also prevent its application for the general purposes of illumination. The same objection applies to the lime-light and to the electric light, neither of which can be produced nearly so economically as an equal amount of light by gas.

In addition to the advantages which gas presents as an economical means of illumination, it is also very applicable in many circumstances as a cheap and extremely convenient substitute for ordinary fuel. It cannot, indeed, compete with coal in the common purposes of cooking and of heating apartments; but when an occasional fire is required for a short time, the combustion of gas is not only more convenient, but is less costly than coal. The following statement, which was the result of many experiments, shows the relative cost of boiling a gallon of water in a copper kettle by means of a recently lighted coal fire, and by a gas stove, and the time required in each case:

	Coal used.	Wood used.	Time.	Total cost.
With fire	4¼ lbs.	¼ of 1d.	1 hour.	77-100 of 1d.
With gas	4 cub. ft. at 4s. 7d. 1000.		20 minutes.	22-100 of 1d.

It appears, therefore, that for occasional purposes, there is a saving of nearly three and a half to one in money, and an economy of two-thirds in time, by the use of gas, in addition to the saving of trouble in lighting the fire, and the avoidance of dust and smoke.

(To be concluded in our next.)

SENSITIVE FLAMES.—The jumping of a naked fishtail flame, in response to musical sounds, was accidentally observed by Professor Lecomte, at a musical party recently, in this country. A lecture was delivered on the subject at the Royal Institution in Great Britain, in the course of which Professor Tyndal exhibited some most extraordinary experiments. Illustrating the sympathy between the flame when in a certain state and certain sounds, he said: "Some of these flames are of marvelous sensibility; one such is at present burning before you. It is nearly twenty inches long, but the slightest tap on a distant anvil knocks it down to eight. I shake this bunch of keys or these few copper coins in my hand; the flame responds to every tinkle. I may stand at a distance of twenty yards from this flame; the dropping of a sixpence from a height of a couple of inches, into a hand already containing coin, knocks the flame down. I cannot walk across the floor without affecting the flame. The creaking of my boots set it in a violent commotion. The crumpling of pieces of paper, or the rustle of a silk dress, does the same. It is startled by the splashing of a rain drop. I speak to the flame, repeating a few lines of poetry; the flame jumps at intervals, apparently picking certain sounds from my utterance to which it can respond, while it is unaffected by others."

New Process for Reducing Ores.

The *Dutch Flat* (Cal.) *Inquirer* thus refers to the process for reducing ore, discovered by Dr. A. T. Dozier, of that place:

"The process is easy, rapid and attended with a completeness not attained, we believe, by any process now in use. The essential features of the process consists in mixing with ores certain chemical agents, bringing and holding the mass at a low red heat, until the affinities forming the metalliferous compound are destroyed. The mass becomes a stiff paste, and on cooling resembles scoria. The metals, silver, copper, lead, composing the ore, take on a globular form, and remain to a great degree separate in the mass, not forming an alloy. The copper appears in an oxidized granulated form. The paste on cooling becomes exceedingly brittle and is easily reduced to powder; the silex and non-metalliferous portion being washed away leaves the silver, gold, copper, etc., in separate masses to be collected. Experiments were made on Camanche ore, from Mono, and on Ophir and Reese River ore. These ores are compounds of gold, silver and copper. The ore from the Camanche has, we believe, baffled all attempts to reduce it. It is shipped, we are informed, to San Francisco, at an expense of $30 per ton, is sent to Swansea for reduction with returns in gold, silver and copper of about $1,000 per ton. Two experiments were made on this ore with most marked and satisfactory results. On pulverizing the brittle mass in a mortar, and washing away the earthy residuum, about 80 per cent. of the silver contained in the ore in a nearly pure metallic form, was obtained. The remaining portion of the silver, with a trace of gold remained unseparated with the copper—the copper being in an oxidized granulated form. The copper with the gold and silver unseparated from it can be run into bars and its fineness determined. The silver obtained pure can also be run into bars. The object of the experiments was not to determine the relative value of the gold, silver and copper in a given quantity of ore, but to show that the Camanche ore, and indeed all ores, can, by the process of Dr. Dozier, for all the practical purposes of commerce, be reduced at the mine, and in some cases the metals can be obtained separately and, he believes, at a greatly reduced cost compared with any processes now in use, and to a far higher degree of perfection. The utility of his process as a valuable discovery in the reduction of ores he is ready to demonstrate on any scale required. While so many of the richest ores in silver, copper, gold or other metals, remain comparatively valueless, owing to the imperfect process used in their reduction, a process so simple, so complete, and so easily tested, and likely to prove of so great utility to mining industry, is certainly entitled to careful consideration, and should be subjected to a practical demonstration."

Brevities.

—A sample of pig iron, from Oregon, said to be the first made on the Pacific coast, has been received in San Francisco.

—The distance from Liverpool to London, which is about the same as that from New York to Washington, is accomplished in half the time.

—The passenger cars on the railway from Moscow to St. Petersburg are two stories high, the upper story being used for sleeping at night.

—Ten years ago there were 25,000 Cherokee Indians. At present there are about 14,000. War, rum and disease have been too much for the nation.

—A bituminous substance, which is called toccolina, has been discovered in Italy. It is similar to our petroleum, and when refined, yields a burning fluid of excellent quality.

—Surveys have been commenced for the improvement of the Illinois river, and its extention by means of a ship canal, so as to admit the passage of 1,500 ton steamers, direct from Chicago to St. Louis.

—The effect of wind, blowing against a square chimney, it is said, is twice as great when blown against a circular chimney of the same dimensions. The form of the latter diverts the strength of the wind.

—A late Boston notion is to generate steam with the aid of waste coal dust, very fine, injected by a current of compressed air into the space over the fire, where it is said to burn with an intensely hot flame, greatly increasing the production of steam.

—Samuel J. Kelso, of Detroit, has received a patent for a machine which can be used for adding, subtracting, and multiplying figures of any desired magnitude, with the greatest ease and facility.

—It is said that there are three extinct volcanic craters near Red Mountain City in Montana, which are so deep that the light is entirely excluded from their depths, and that when a stone is thrown into them, no sound can be heard of it reaching the bottom!

The History of Illuminating Gas.

Van Helmont, an alchemist, first analyzed atmospheric air, and discovered that it was composed of gases. In the Spa waters of Germany he first observed carbonic acid gas, and learned to distinguish it as a distinct elastic nëriform substance to be elicited only by chemical decomposition, and considering it as more of an essence than common atmospheric air, he gave it the German name of *Gheist* (ghost or spirit), from whence comes our English word gas. This great discovery dates about 1624.

Van Helmont's discoveries lay apparently dormant for many years, but they were not forgotten. Scientific curiosity was approaching then by analysis, and already the first truths had grown and put forth branches in that vast collection of observation, at first so often timid and peurile, the Philosiphical Transactions. In 1667, a Mr. Shirley, a gentleman living at Wigan, wrote to describe a series of experiments he had commenced in 1659 on the waters of a burning spring on the Warrington road. This water burned like oil when a candle was applied to its surface, being impregnated with carburetted hydrogen gas from the coal seams that underlaid it. Shirley, a thoughtful man, saw at once that it was not the water that burned, but only some emanation from the coaly earth. This he proved by draining the place and setting fire to the day earth, which threw up a cone of flame as wide as a hat and a foot and a half high. This flame he proved he could extinguish by water.

Boyle carried further and gave more popularity to Van Helmont's experiments. He proved that fixed air and inflammable air are elastic fluids, capable of being exhibited unmixed with common air. In 1726, Dr. Hefler Hales distilled coal, obtained gas, and observed and noted down its elasticity. In 1733, the Philosophical Transactions record some valuable and suggestive experiments made in a coal-pit belonging to Sir James Lowther, near Whitehaven, in Cumberland. The pit was near the full sea-mark, and intended to drain a neighboring colliery. When the pit was sunk forty-two fathoms from the surface, the workers came on a six-inch bed of black stone, full of clefts, under which lay a seam of coal. When this black stone was pierced, a quantity of damp corrupted air came bubbling through the water with a hissing noise. On a startled workman putting a candle towards it, the water caught fire and rose in a wave of flame two yards high. This frightened the men so much that they beat out the fire with their hats, then ran to the rope and escaped up the pit.

The steward of the works then came down and again lit the gas, which soon rose and covered the bottom of the pit a yard deep. Extinguishing the flame, the men, who had returned, opened a larger aperture in the bed of black stone. This time the gas flared three yards high, and almost stifled them. Unable to flap it out with their hats, they got down a spout from a cistern and so extinguished it. After this, no candles were allowed in the pit till the coal was reached, and a tube carried into the open air to carry off the gas. This stream of gas continued unabated in strength and quality for several years. Many savans came to collect this strange form of air in bladders. Some of it was taken to the Royal Society and there burnt, to the delight of the wigged philosophers. A small pipe was first put into the bladdar, and the gas pressed through that into the flame of a candle. Still, no glimmering of its vast capabilities of usefulness broke upon the savans. They were not quite ripe for that discovery yet. It was observed that sparks would not light it; so the workmen used flint and steel in the dark passages, and toiled on by the miserable and momentary twinklings. After the tube was fixed, the pit was no more troubled with the mysterious "damp and corrupt air," which would burn after being kept a whole month in a bladder. In 1726, "the ingenious" Dr. Stephen Hales first obtained gas by distilling coal; but his experiments were rather with a view to observe the elasticity than the inflammability of the new vapor.

In 1739, the Rev. Dr. John Clayton, Dean of Kildare, went to see a ditch near Wigan (probably Mr. Shirley's spring), because he heard that the water there would burn like brandy, would boil eggs, and thirty years before had actually boiled a piece of beef: but was now much less fierce, especially after rain. Some experiments, not unlike Shirley's, soon convinced Mr. Clayton that it was not water that really fed the fire. Digging down half a yard, he found a shaly coal, which yielded an inflammable vapor. To prove the vapor came from the coal, Mr. Clayton distilled some coal. From this he obtained, first, a black oil (tar) and lastly, a spirit so intractable as to force the luting of his vessels, break the glasses, and eventually catch fire when a candle came near it. He repeated the experiments with a bladder, but they attracted but little notice. They harmonized with no fashionable and popular theory of the day, and were therefore disregarded; but still the secret was unravelling. Van Helmont had decomposed air. Shirley had observed that certain air rising from the earth would burn; the Whitehaven men had shown that inflammable air could be kept in bladders; and now the learned Dean proved that it could be obtained by distillation from coal.

In 1767, Dr. Watson (afterwards Bishop of Llandaff) ascertained that gas retained its inflammability and elasticity whatever quantity of water it had passed through. It was in Cornwall that gas was first used for lighting houses. In 1792, Mr. Murdoch, a metal founder at Redruth, turned the inflammable air to account, to save oil and candles. He distilled gas from various substances, and lighted his own house, offices, and street. He used to carry bladders of it to use at night in his little steam carriage, and was very near being suspected of witchcraft. In 1795, he proposed to Mr. James Watt to take out a patent for gas as a substitute for oil. In 1797, Watt lit up with gas his new foundry at Old Cumnock, in Ayrshire; and in 1798 he renewed his experiment on a more ambitious scale at the Soho Foundry, near Birmingham. He also contrived the best modes of preventing the smell or the smoke of gas being offensive.

The Peace of Amiens, and the subsequent rejoicing in 1802 gave the enterprising discoverer opportunities of printing his thoughts on the minds of Birmingham people. On that occasion he illuminated the whole front of his works with various devices, and the Birmingham mob came in thousands to gaze, wonder and admire.

Mr. Murdoch had had many difficulties to overcome. But as he united scientific knowledge with great practical skill, his perseverance enabled him to finally triumph. The retorts first used by him were similar in form to the common glass retorts employed in chemical experiments; he next made trial of cast-iron cylinders, containing about fifteen pounds of coals, which he placed perpendicularly in a common portable furnace; but in 1802 he had recourse to the horizontal mode of setting them. In 1804–5 he varied his plans, and constructed his retorts with an aperture or door at each end, one of them for introducing the coal, and the other for taking out the coke; but this method he found inconvenient and troublesome. In the works which were constructed in 1805–6, for Messrs. Phillips and Lee, at Manchester, he tried one of a different kind, which was very large, and had the form of a bucket with a cover to it. Into this a loose grate, or iron cage, was introduced, for holding the coal; and by this contrivance the whole of the coke could at once be heaved out of the retort. This was so capacious as to contain 1,500 weight of coal, but afterwards smaller sizes in an elliptical form were tried. These were found to produce a greater quantity of gas, also of a higher degree of illuminating power. Indefatigable in the pursuit of improvement, he made a great number of experiments in order to learn under what circumstances not only the best gas, but the largest quantity of it could be obtained.

This remarkoble man also used quicklime to purify gas, and even succeeded in removing the smell, though at the expense of the light. He tried burners of almost every possible shape, and at various pressures. He tested the various sorts of coal, and the relative economy of gas, as compared with candles. Watt, Boulton, Creighton, and all the leading minds of Birmingham, aided Murdoch in these useful researches. But various shafts had been struck, and already another passage had led to the same discovery.

(To be continued.)

Titaniferous Sand.

A curious paper has been received by the Academy of Sciences, on a sort of sand which is very common in the Portuguese Islands of Santiago, in the Cape Verd archipelago. This sand is composed of extremely small grains, jet black, but not crystalline, accidentally mixed up with a very few colored particles. It is attracted by the magnet, but all of its grains do not possess this property; and to separate those that do, M. Silva has employed the very process of attraction above alluded to, whereby he has obtained 82 gms. of magnetic matter out of 162 gms. of sand, being a proportion of 55 per cent. The magnetic grains are all black, with a metallic lustre; they are very hard, but may still be ground to powder. Their density is 4·762. The powder soils the fingers, having lost none of its original blackness. Concentrated hydrochloric acid will attack it at a high temperature, especially in a phial provided with a long tube; nevertheless a few colored particles remain untouched and a white precipitate is formed, which, however, disappears when a little zinc is thrown in, and the solution then assumes a violet color. By analysis it is found to contain 21 per cent. of titanic acid, 52 of metallic iron, 2 of magnesia, 2 of alumina, and traces of manganese and emery, the latter constituting the residue. The unmagnetic portion of the sand is composed of dull black grains, which are not so hard as the others, and can be much more easily reduced to powder, which then is reddish and does not soil the fingers. Its density is 3·434; it does not melt under the action of the blow-pipe, and is but partially soluble in hydrochloric acid at a high temperature. It contains silicic and titanic acids, iron, lime, alumina, magnesia, manganese and emery. This sand might become very valuable from the iron and titanic acid it contains.—*Paris Galignani.*

Useful Recipes.

To Detect Woody Fiber in Paper.—The paper is touched with ordinary strong nitric acid. If wood fiber is present the paper will be colored brown, especially on warming.

Glue for Metals.—A good glue for metals may be made by mixing with sixteen parts of melted glue one part gum ammoniac, and then adding one part of saltpetre acid.

To Produce Aniline.—By adding to nitro-benzole an acid solution of chloride of tin, a strong reaction is obtained in a few moments, great heat is evolved and aniline is produced.

Alloy for Hard Tools and Bells.—Twenty parts iron turnings or tin waste, eighty steel, four manganese, and four borax. To increase the tenacity, the proportions may be varied and two or three parts wolfram may be added.

An Ink for Glass.—M. Kessler, of France, has, by means of flour-hydrate of ammonia and hydro-chloric acid, properly thickened, made an ink by which, with any pen, ineffable characters can be traced on glass. This ink will be of service to the chemist and apothecary in labelling bottles, and marking graduations on glass.

An Elastic Glue.—Take a quantity of good carpenter's glue, pour cold water over it and let stand until it becomes a gelatinous mass; then put it into a warm water bath until it becomes dissolved. Now add as much glycerine as there was glue in the first place, then mix and stir up well, and continue to beat it until the water has become evaporated. The cooled substance will be an elastic glue, suitable for a variety of substances, such as stamping, etc,

A Cheap Glass Cutter.—Take an old three-cornered file, heat it red hot, and plunge it into a previously prepared mixture of equal parts of snow and salt, stirring it about so as to cool it as quickly as possible. Then grind the point on a whet stone, preserving the three sides as nearly as possible, and it is ready for use. Lay the glass to be cut on a perfectly smooth surface, apply a thin flexible rule, and draw the point of the file quickly over the glass. To insure success it is needful to notch the edges of the glass at the extremities of the scratch. The file can be reground when it becomes dull. Such an instrument will be found serviceable for cutting glass for windows, and all ordinary purposes.

To Render Resins Soluble.—Copal and other refractory resins are soluble in oil of turpentine, etc., if, after they have been kept heated for 15 or 20 minutes to a temperature of 350° or 400°, of course in closed vessels. The best way of operating is to heat the resin for a few minutes in an open vessel; five or six per cent. of water are by this means expelled. The vessel may then be safely closed, and the heating continued. The product gives very excellent varnishes. To avoid the necessity of heating the varnishes so made, in order to heighten their luster, the oil, etc., which it is intended should be used, may be heated together with the resin. The product then simply requires dilution.

Chemical Products from the Distillation of Peat.

[From "Facts About Peat." by T. H. Leavitt.]

In 1849, public attention in England was very much excited by an extraordinary statement made in the House of Commons by Mr. Mahon, and supported by Lord Ashley, asserting the immense area of bog in Ireland to contain substances of great economic value, to be produced at comparatively small cost. Lord Ashley's statements were based upon the authority of Mr. Owen, whose experiments went to show that, chemically treated at remunerative cost, the product would be the following substances: carbonate of ammonia, soda, vinegar, naphtha, paraffine, camphene oil, common oil, gas of value, and ashes.

The publication of this remarkable statement was quickly followed by a letter in the *Times*, from Mr. Henry Seaman, of Plymouth, asserting that he and his neighbors lost £20,000 in an attempt to turn the peat bogs of Dartmoor to profitable account, in the same manner as the peat of Ireland had been treated by Mr. Owen and his partner.

This letter was followed by one from Mr. Robert Oxland, a practical chemist, residing at Plymouth, who rather confirmed the principal parts of the statement made by Lord Ashley.

Subsequently the whole matter was taken up and thoroughly dissected in an article in the *Illustrated London News*, No. 384, from which we quote a single paragraph: "No doubt a fair marketable value is taken for the several items; but we believe, and we express this most conscientiously, that the cost of production would exceed their commercial worth."

Again: in November, 1850, in the *Times* is found the following statement:

"It now appears that Mr. Owen, whose course, from the first, was in no way inconsistent with Lord Ashley's testimony respecting him, has been, for the past year and a half, quietly engaged in testing the merits of the process to an extent that would properly authorize a definite estimate of its results. These labors have been carried on partly under the superintendence of Dr. Hodges, the Professor of Agriculture in Queen's College, Belfast, and partly in the neighborhood of London, at the premises of Messrs. Coffey & Sons, engineers; and the conclusions now represented to have been arrived at, are of an exceedingly satisfactory nature. They do not promise the 500 per cent. originally talked of, but according to a certified estimate rendered by Messrs. Coffey & Sons, they show a profit of upwards of 100 per cent.

"This estimate, which is framed for an establishment consuming 36,500 tons of peat per annum, is as follows:

EXPENDITURES.

36,500 tons of peat, at 2s. per ton	£3,650
455 tons of sulphuric acid, at £7	3,185
Wear and tear of apparatus, etc.	700
Wages, labor, etc.	2,000
Cost of sending to market, and incidentals	2,182
Profit	11,908
	£23,625

PRODUCE.

365 tons sulphate of ammonia, at £12	£4,380
255 tons acetate of lime, at £14	3,570
19,000 gallons naphtha, at 5s.	4,758
109,500 lbs. paraffine, at 1s.	5,475
73,000 gallons volatile oil, at 1s.	3,620
36,000 gallons fixed oil, at 1s.	1,800
	£23,625"

After referring again to the experience of Sir Robert Kane, as given in his "Industrial Resources of Ireland," and the experiments made by the Dartmoor Company on a large scale, the *Times* says: "We wish these results may be realized; but we have no hope of anything so satisfactory."

Professor Brande read before the Royal Institution, in 1851, a paper upon peat and its products.

Special mention was made of the "tallow-peat" of the banks of Lough Neagh, which, from the brilliant flame attending its combustion, has been used for illuminating purposes as well as for fuel. He says:

"Peat may be rendered valuable either from the charcoal which may be obtained from it, or by various products derivable from what is called its destructive distillation.

"When it is desired to convert peat into charcoal, the plan adopted by the Irish Amelioration Society is to carbonize blocks of peat, partially dried on trays of wicker-work, in movable pyramidal furnaces. The charcoal so obtained varies in character with that of the peat which produces it; and, when peat is compressed previous to its carbonization, the resulting charcoal exceeds the density of common wood charcoal.

"The efficacy of this charcoal in the manufacture of iron, in consequence of the small quantity of sulphur it contains, was mentioned, and its deodorizing and purifying qualities experimentally exhibited.

"The elements of peat are essentially those of wood and coal, viz., carbon, nitrogen, hydrogen and oxygen."

In conclusion, Professor Brande reviewed the various products of peat derived by distillation, and their uses. They appear to be:

1. *Sulphate of Ammonia*—This substance is employed in the preparation of carbonate and muriate of ammonia, of caustic ammonia, and in the manufacture of fertilizing compounds.

2. *Acetate of Lime*, which is in constant demand as a source of acetic acid, and of various acetates largely consumed by calico printers.

3. *Pyroxylic spirit* (or wood alcohol), used in vapor lamps, affording a brilliant light, and for the preparation of varnishes.

4. *Naphtha*, used for making varnishes, and for dissolving caoutchouc.

5. *Heavy and fixed oils*, applicable for lubricating machinery, especially when blended with other unctuous substance, or as a cheap lamp-oil, and as a source of lampblack.

6. *Paraffine*—This article is largely used for the manufacture of candles.

(To be continued.)

The New Electro-magnetic Light.

A series of interesting experiments are at present taking place at the United States Barge-office, foot of Whitehall-street, New York, involving the exhibition of an electric light, produced by magneto-electric agency, and intended for use on shipboard, in lieu of the old-fashioned signal-lanterns, and in light-houses.

The *American Artizan* of October 23d, contains the following description:

"On Thursday evening, Oct. 17, at half-past eight o'clock, the first experiment with this newly-invented light was made from the cupola of the Barge-office, and resulted most successfully. A volume of intense light, some two feet in diameter, was thrown from the apparatus containing it to the Staten Island ferry, a distance of four and a half miles. So brilliant were the rays of light that passengers on board the ferry-boat leaving Staten Island ferry could see to read their newspapers. The rays directly emanating from the lamp are so intensely bright that the eye cannot long rest upon the focus without being dazzled from their intensity. The conductors leading to the lamp in the cupola are supplied with electricity from a powerful electro-magnetic battery placed in a shed on the ground floor in the rear of the Barge-office. The battery, or electric machine, consists of seven rows of magnetic receivers, each row containing eight magnets, fixed into a cylindrical shaft which is kept revolving, the electric agent also revolving and coming in contact with the magnets at the rate of four hundred revolutions per minute. A concentrated magnetic power is thus communicated from the conductors (positive and negative) attached to the machine to the lamp in the cupola. The lamp occupies a position immediately in front of the apparatus which feeds it—an apparatus resembling the works of a clock.

"The agents employed to receive and emit the light are two square spiral crayons, composed of coke made from anthracite coal, eight inches in length and one third of an inch square. When supplied with electricity these crayons, with the positive and negative points almost touching each other, burn with a steady, undiminished light for four hours, at the trifling cost of eight cents, and when burned out are immediately replaced by a new set in another lamp. The light thus obtained is projected with immense force through a Fresnel lens twelve and a half inches in diameter and sixteen inches long, and is what is called a "third-class" lens; the largest or first-class of these lenses measuring some two feet in diameter. On a sea-shore, this newly discovered light can be projected with a third class lens a distance of forty miles at sea, and can be visibly seen by vessels at that distance. In foggy weather the light penetrates the fog, so powerful is its propulsive strength from the point where it is emitted. It is estimated by the inventor of this electro-magnetic machine, that four of these lamps placed at different quarters of a large city would be sufficient to light every part of it, the four lamps being supplied from one battery. One battery will also supply every house in a whole block with a light cheaper and superior to gas. It can also be used for supplying light to mines, thus avoiding the possibility of explosions. Mr. Brady, the New York photographer, is about to apply this light for photographic views and portraits. It is said to be a better light for this purpose than the sun's rays. This new discovery is in successful operation in two lighthouses at La Heve on the bay of Havre, France. It has also been introduced on board the French steam yacht, *Jerome Napoleon*.

"The inventor is Professor Nollet, of Paris. The present apparatus, however, has been patented by Auguste Berlioz, as an improvement upon Professor Nollet's principle. The first experiment was made under the supervision of Mons. Eugene Von Nordhausen, the representative of the patentee; others will soon be continued, when, weather permitting, it is expected that photographic views of Brooklyn will be obtained, by throwing rays of electric light across the river from the Barge-office, where the camera and operators will be stationed."

Petroleum Fuel for a Dummy Locomotive.

A trial of the capabilities of petroleum as a fuel for producing steam was made on one of the dummy locomotives of the Hudson River Railroad recently. In reference thereto the New York *Tribune* says: The mode of using the petroleum was the method introduced and patented by Mr. Calvin Pepper, and its chief peculiarities consists in the dispensing with the ordinary burners and retorts, and burning the oil in connection with water, from a surface of sand. The grate and ash pan of the furnace had been removed, and in their place was substituted a circular pan of cast-iron about eighteen inches in diameter and eight inches in depth, having a perforated bottom covered with a disk of wire gauze. The pan is filled with coarse sand, and the oil is conducted from its receptacle through a pipe, into a mass of sand. Another pipe conducts water from the tank of the locomotive into the sand, and the oil rises to the top of the water, and burns on the surface of the sand. The water, beside furnishing a convenient means for controlling the strength of the fire, also becomes decomposed by the heat, and aids the combustion of the oil. The bottom of the fire-box is made air tight, and a blower, driven by steam power, furnishes a draft, which may be regulated at pleasure. If preferred, the exhaust steam from the engine, or a steam jet from the boiler, may be used to supply the draft. The boiler used in the experiments was of the upright tubular style, about four feet in diameter and about ten feet in length, and two-thirds filled with cold water at the commencement of the experiments. Twelve quarts of crude petroleum and three quarts of gasoline for lighting were poured upon the sand in the fire box In 15 minutes' time from the application of the match, vapor began to show at the upper guage cock. In about 38 minutes, with an inefficient draft of air, the guage indicated 5 pounds pressure of steam, and in 50 minutes it had risen to 30 pounds. When the pressure reached 110 pounds the locomotive was started, and run about 20 minutes, when it was found that the apparatus for supplying the air draft was so deficient that the supply of steam could not be maintained. Further experiments were therefore postponed to another day. Though the fire was kept up nearly two hours, only about fifteen gallons of petroleum were expended.

SOURCE OF SALT IN THE SEA.—The San Francisco *Scientific Press* says: The carbonic acid of the air is constantly acting upon the rocks on the surface of the earth, thus turning them to clay, and forming carbonates with the soda, potash, lime, and magnesia set free. These are carried down as carbonates to the sea, where the carbonate of soda decomposes the chlorid of calcium of its waters, and forms common salt and carbonate of lime. This series of actions is the source of the salt of the sea, of clays, and of limestones. Organic living things do not generate the carbonate of lime, but appropriate it, when formed for them by chemical reactions; and thus great portions of our limestone rocks are made up of fossil remains. In a volume of limestone there is separated and condensed from the air a large amount of carbonic acid gas; the early atmosphere was, therefore, very dense and unfit for the sustenance of the higher forms of life, until by far the greater portion of this gas had been removed by the formation of the carbonate of lime and vegetable matter now constituting coal and petroleum.

Philadelphia Public Park and Water Supply.

The following embraces the principal points in Mr Graeff's report, submitted to the Park Commissioners on Saturday, October 12:

"The superior quality of the water of the Schuylkill at Philadelphia, chemically considered, when free from impurities introduced by human agency, cannot be doubted. All analysis yet made place it in the first rank as a water proper and desirable for the ordinary domestic uses; perfectly soft, pleasant to the taste, and remarkably free from organic matter, it compares favorably w th the water supplied to other places.

"A gallon of Schuylkill water contains 7.04 grains of solid matter, while the Croton river supplied to New York 10.93. The average of four analyses of the Schuylkill shows 5.76 grains per gallon."

The report in referring to the presence of sulphuric acid, states—

"That it is undoubtedly present in large quantities in the upper waters of the river, and at Schuylkill Haven as much as ten grains to the gallon have been detected; but fortunately the whole of this acid is neutralized, or rather converted into sulphates of lime and magnesia, by the waters of several streams, which, flowing through limestone formations, discharge their waters into the river at and above Reading, and even at that place the water has been found to test alkaline."

In reference to impure drainage in the river, it is stated that it is found that the increased demands for water do not obey the same laws as that of the population, each year showing that a larger supply is required than the accession to the number of inhabitants would appear to indicate. The increase in the population for the last ten years preceding 1850 was about 7,070 [per year], at which rate the population now would be 788,871, and, taking the same rate of increase for the next twenty years, we should have in 1887 a population of 2,278,680. The increase in the quantity of water supplied in the last ten years has been about 88 per cent., at which rate the average supply in 1887 would be 92,725,750 gallons per day, and the maximum required during the summer months would probably be 145,622,367 gallons per day.

The flow of the Schuylkill has been set down at about 400,000,000 gallons per day, but during ten months of the year would probably be at least five times greater. The report estimates the available waters of the whole valley of the river to be 50 per cent. of the annual rain fall, making the whole flow equal to ninety billion cubic feet a year, or an average of 1800 millions per day. It is suggested that this waste water could be made available by establishing pools or lakes of storage at several points on the river, in which the superfluous waters could be kept for gradual use. The committee, in conclusion, offer the following suggestions:

First. By the construction of a sewer from Monayunk to a point below Fairmount dam.

Second. By the improvement of the water power to its fullest extent.

Third. By the erection of large auxiliary engines, to be used during the dry weather of summer, which might, to some extent, be so arranged as to be able to raise the water from below the dam, in case any accident should occur to that important structure.

Fourth. Additional engines of large size at the Spring Garden Works, capable of supplying the Delaware reservoirs as well as their own.

Fifth. The construction of very large distributing reservoir or reservoirs.

Sixth. The building of large retaining, compensating reservoirs upon some of the streams at the headwaters of the river.—*Public Ledger, Oct.* 15.

Quickened Production of Cast Steel.

M. Victor Gallet, of the Department of the Vienne proposes a process to prepare cast steel, obtaining it from iron by one operation, superseding cementation in furnaces to purify the iron, and to combine it chemically with wood charcoal by the cementation which takes place in the vessel in which the steel is made. M. Gallet takes iron which has been submitted to one rolling operation, only coating it with a paste made by mixing water with the following composition: Wood charcoal 40 parts, limestone 37 parts, carbonate of potash from 10 to 20 parts, soot 10 parts, oxide of manganese 3 parts, resin 3 parts, common salt 1 to 3 parts, and vegetable mould or clay say 2 parts. The vegetable mould and soot may be omitted according to circumstances. The iron coated with this composition is melted in a crucible, and the cast steel thus produced. As charcoal has very little affinity for iron, its combination is secured by electric currents arising from the different ingredients of the paste. The carbon and the carbonates (of lime and potash) in their mutual reaction produce a greater proportion of carbon and take a smaller determined proportion. The change of the carbon and the carbonates, the action of the hot iron upon the resin and the aluminous oxides of potash at a stated time, engenders or produces numerous sources of electric currents; ultimately the alkaline metals appear at a stated time and absorb with avidity phosphorous, sulphur and the other metalloids. The alkaline and earthy bases pass to the scoria. The reactions of the substances employed produce the following effects: Electric currents; complete reduction of the manganese with the steel; the reduction of injurious matters, and the alkaline metals with the absorbents and metalloids; the disengagement and elimination of azotic gases, since calcined potash, reduced in the presence of steel and charcoal at a given moment, absorbs nitrogen to form cyanides of potassium and of calcium. —*Am. Exchange and Review, Oct.*

General Summary.

Closing of the American Institute Fair.—The Great Fair of the American Institute was closed on Saturday, the 26th ult, after a very successful career. The closing exercises were very interesting, and consisted of an address by the Hon. Horace Greely, and the distribution of premiums to successful exhibitors. The latter was a great task, there being several hundred premiums given. It is estimated that 350,000 persons visited the Fair. It is the intention of the managers to erect an exhibition building to cover five acres, and for temporary use to provide a corrugated iron structure, 400 feet long by 200 wide.

Concerning Gas.—The gas companies of New York city and its dependencies, ten in number, have an aggregate storage of over ten million cubic feet, in forty gasholders, working between three and four thousand retorts; turning out 2,500,000 cubic feet of gas per annum, and collecting over $8,000,000 from consumers. The London gas companies number thirteen, and last year supplied that city with the enormous amount of 8,653,000,000 cubic feet. The "Parisian Company for lighting and heating by Gas" lights the whole of Paris, the great part of the townships of the Department of the Seine and some of those *Seine-et-Oise*. The company have ten gas works fifty gasometers, and in 1866 distributed 1,360,000,000 cubic feet. London consumes on an average 936 feet per head of the whole population. Paris furnishes on an average 740 cubic feet for each inhabitant.

New Use for Petroleum.—One of the latest inventions is to burn kerosene oil in gas pipes, with all the various plain or ornamental fixtures, while the light is mellower than gas, and it is claimed that the expense is one-third less. The oil is contained in reservoirs which may be near the burners, or in a room overhead, or in a cellar, or even in an outbuilding. If these reservoirs are lower than the burners, the oil is elevated by a cheap force pump, and it can pass to the burners no faster than it is used; hence explosion is impossible. It has been estimated that over 5,000 lives have been lost in this country by the explosion of lamps. This method of lighting is well adapted to parlors, offices, churches, lecture rooms, and in particular to machine shops and factories.—

New Discoveries of Copper.—It is reported that new discoveries of copper have been made southeast of the Calumet, on Keweenaw Point, Lake Superior, but in consequence of the owners of land on which the Calumet lode was opened, having realized nothing beyond the price of wild land, holders of mineral land are now so suspicious lest a discovery of copper may have been made on their property, that when asked to sell at ordinary rates, they take the alarm and decline negotiation, preferring to wait and see if "anything turns up."

The Metalline Land Company of this city, which, sold, without knowing its then newly-discovered value, forty acres of Calumet territory, also own, it is said, land in the vicinity of the new discovery which, it is asserted, surpasses any show of copper hitherto uncovered in the Lake Superior copper region.

New Water Main.—Men are at work laying the new main pipe for the Brooklyn Water Works. It has been completed from the Ridgewood Reservoir down Atlantic avenue to New York avenue, and will probably be brought down to Classon avenue in che course of two weeks. This main is four feet in diameter; the large main of the Croton over High Bridge is seven feet. The old main in Brooklyn is three feet. When the work is completed, which will cost $1,000,000, the capacity for the delivery of water will be more than double what it is at present. About 12,000,000 gallons are now delivered daily; with the new main 25,000,000 gallons can be delivered with more force than at present. It is expected that the work will be finished in about three months.

Boats of Paper-Mache.—Mr. George A. Waters, of Troy, N. Y., has been showing that paper makes the best material for shell boats, by constructing one thirty feet long, which weighs only 40 pounds, and is in every respect, it is said, superior to boats made of wood. It is quite thin, lighter than a wooden boat, is rendered impervious to water by a coating of oil and other compounds, and it is asserted that it is more durable, and that it will stand shocks which would destroy a wooden shell.

A Humboldt County Mine.

The Gold Hill *News* gives a history of the Trinity and Sacramento Silver Mining Company, of New York, whose mines are in Arabia District, Humboldt county, in that State. The principal mine of the company is the Montezuma. The ore of this ledge consists of an oxide of lead and antimony, and much of it combined in the form of an antimoniate of lead. The ore contains from $50 to $300 of silver per ton, and the entire vein of from fifteen to twenty-five feet in thickness, is about fifty per cent., or one half metal. It is reduced by smelting. The reduction works at first erected, though incomplete, produced from three hundred tons of ore $25,000 in fine bullion. The product of the smelting operation is an alloy of lead, antimony and silver, the antimony varying from thirty to forty-five per cent. To separate these metals, two distinct processes are required, and in furnaces peculiarly adapted to each operation. In the first the antimony is volatilized and driven off, leaving an alloy of pure lead and silver. This is called calcining. In the second, the lead is oxidized, forming litharge, and run off, leaving the silver alone in the furnaces, in large cakes $3,000 to $5,000 each. This operation is called cupelling. The ore is readily smelted, the chief expense being in the refining. At present fifteen tons are reduced daily, producing about $1,500 in silver alone. The pure lead reduced from the litharge, after the loss incident to the operation, amounts to four tons daily. This is piled up to await the railroad which will run within a mile of the works before another year. The lead will then pay nearly the entire cost of producing the silver, leaving that a clear profit. The antimony now wasted, may be made to add largely to the profits of the mine. The ore is smelted by charcoal, which costs fifty cents a bushel. It is from nut pine, and is from forests of timber twenty.five miles distant from the smelting works. Great labor is required to procure the coal. The fuel for the calcining furnace is sage brush and greasewood of the country, two years' supply of which, it is estimated, lies within a range of three miles of the works. Five first class teams are used in procuring this fuel. The least part of the expense is the wood for the cupelling furnaces, only from half to three quarters of a cord a day being used to each furnace.—*Stockholder.*

Mining Share Market.

The San Francisco Weekly Stock Circular of September 14, gives the market rates of mining stock as follows:

The mining share market has been quite active during the period under review, at greatly depressed rates. The operations in several leading stocks have been very heavy, a large proportion being sold short. The "bears," evidently, have complete control of the market, and the effect of this action is noticeable throughout the entire list. The bullion returns from eleven different claims on the Comstock lode during the month of August, amounted in round numbers to $1,200,000 against $1,220,000 in July. In these aggregates we do not place the yield of the Yellow Jacket company, the information not being accessible.

HALE & NORBROSS sold early in the week at $2,000 seller 30, declined to $1,500 s. 30, and closed at $1,500 s. 30. The actual returns of bullion made by the mills for the month of August show an excess of $3,086 over the 65 per cent. yield reported last month, the total amount being $124,664 69. A dividend of $125 will be payable on and after the 16th inst.

SAVAGE brought a host of purchasers into the market under the very marked recession which this stock experienced during the past week, falling from $200 to $135 per share, a decline of $1,300 per foot, rallying to $156, receding to $149.50, and closing at $135. The sales during the week at the regular session of the Board foot up 4,364, which at an average price of say $150 per share, will show the transactions in this stock to have amounted to $654,600.

CROWN POINT has been less active at declining rates, opening at $945, gradually receding to $820, and closing at $775. During the month of August 2,081 tons of ore were reduced, showing a yield of $55,291 85, or $26.08 per ton.

CHOLLAR-POTOSI rose from $428 to $437.50, fell to $345, rallied to $376@387, and closed at $369. The bullion returns for the same month reach $350,000. A dividend of $25 per share is payable to-day.

GOULD & CURRY—The rapid decline of this stock at the close of last week was due to the levying an assessment of $25 per share, or $100 per foot. During the present week the stock rose from $307.50 to $325 per foot, declined to $300, then sold at $325@310, closing yesterday at $310.

OVERMAN has been to a great degree inactive, selling at $54@57.50, then at $67.50, and closing at $63. During the month of August the bullion yield amounted to about $20,000.

EMPIRE has been in the market at $175, buyer 30. The bullion returns in August amounted to $22,333 80 against $25,000 in July.

SIERRA NEVADA sold to a considerable extent at $13 @14, closing at $7.50. An assessment of $10 per share was levied on the 11th inst.

IMPERIAL met with considerable inquiry, opening at $152.50, receding to $135, selling at $142, and closing at $135.

The aggregate sales of stocks, legal tender notes, etc., amounted to $1,768,785.

PATENT CLAIMS.

Pertaining to Gas, Mining, Petroleum, Water etc.

69,758.—PUMP.—T. B. Bryson, New Castle, Pa.

I claim the cylinder, A, piston-heads, C, cam-grooved disk, H, and connecting-rods hung in said cam-groove, when all are constructed and arranged together substantially as and for the purpose specified.

69,815.—LAMP.—Anson Judson, Brooklyn, N. Y.

I claim, 1st, The construction of the burner of a flat wick kerosene or coal-oil lamp with two or more stationary supports, D, and F, or their equivalents, said supports being permanently attached to the burner or forming portions of the same, and extending upward above the body thereof, substantially as and to the effect herein above set forth.

2d, The catch or device, G, or its equivalent, substantially as and to the effect specified.

3d, The combination of the stationary supports, D and E, and clasp, F, and the burner, B, or their equivalents, as and to the effect specified.

4th, The construction of the catch, G, in one piece with the clasp F, substantially as herein specified.

69,880. — ELECTRO - MAGNETIC ENGINE. — William Wickersham, Boston, Mass.

I claim, 1st, So forming metallic conductors in electro magnetic engines that, in their extension from one end to the other of said engine, they shall pass nearly around one or more electro-magnets and so arranging them that when an electric current passes through said conducting-bars it shall produce magnetic polarity to the said electro-magnets, substantially as described.

2d, In combination with said metallic conductors, the arrangement of the receptacle, b, substantially as and for the purpose described.

3d, So forming the electro-magnet in an electro-magnetic engine that it may become a part of the rim of a fly-wheel, and so arranging it on the outer edge of a disk in connection with the shaft that when said rim revolves the shaft will revolve also, as described.

4th, The cut-off, arranged and constructed as described, in combination with the said metallic conductors playing over the interrupted parts of said cut-off, as described.

5th, Adjusting in electro-magnetic engines while they are in motion the relation of the circuits to the magnets, substantially as described, and for this purpose I claim the spiral slotted tube, k, arranged and operated substantially as described

6th, In combination with said metallic conductors and magnetic fly wheel, the arrangement of two or any desirable number of said fly-wheels, on the same shaft, all operating together in the manner described.

7th, Arranging the conducting-bars in groups around the shaft, and securing each group in its proper position, independently of the others, as described.

8th, Having the spaces between the groups of conducting-bars filled with blocks of the same form of said spaces and having said blocks secured in their places by a metallic ring, K, as described.

9th, Making said conductors in a thin, ribbon-like form, having one edge near the said electro-magnet, and the other edge from said magnet, all substantially as described and for the purpose set forth.

69,882.—OIL-CUP.—Charles Williams, Vineland, N. J., assignor by mesne-assignments to himself.

I claim the elastic tube, C, in combination with the nozzle, B and of such length that the perforated ball, D, upon its lower end shall reach either the top side or bottom of the cam, A, as herein described for the purpose specified.

69,894.—APPARATUS FOR PROVING GAS-PIPES.—A. C. Beardslee, Brooklyn, N. Y.

I claim the combination of the bell, A, base-piece, B, with its passages, F, H, diaphragm, C, spring-borne graduated rod, D, and check valve, J, all for operation together, substantially as and for the purpose herein set forth.

2d, The arrangement in connection with a diaphragm indicator, substantially of the character specified, of an ether-box, essentially as and for the purpose or purposes herein set forth.

THEORY OF STEEL.—M. H. Caron, in a communication made to the French Academy of Siences, attributes the combination of iron with carbon or other elements of the same family by which tempered steel is formed, to the sudden shrinking of the mass, which he considers analogous to the instantaneous compression produced by hammering. In illustration of this point, he found that by hammering a bar of iron heated to a bright redness, on an anvil covered by powdered charcoal, the face of the bar in contact with the charcoal was, in spots, converted into steel, and capable of resisting the file. His researches also confirm the results of previous experiments, that the density of steel is decreased by tempering. In one specimen, after thirty successive temperings, the density was reduced from 7.817 to 7.743.

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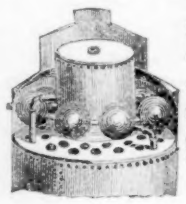

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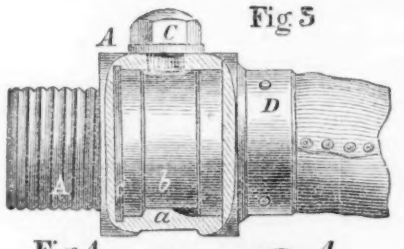
Fig 3



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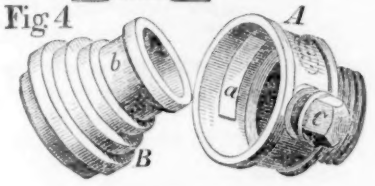

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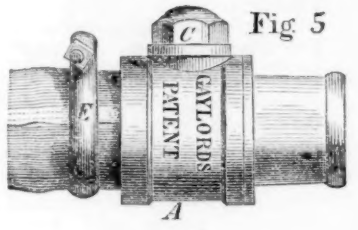

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For lighting Private Dwellings, Churches, Hotels, and Factories in any locality and independent of any Gas Company.

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GENTS.: We are pleased to inform you that your SOLAR GAS MACHINE, which we have now used in our factory at Mansfield Mass., for more than one year, has given us entire satisfaction in all respects.

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From the Superintendent of the Schaghticoke Woolen Mill, N. Y.

SCHAGHTICOKE WOOLEN MILL, N. Y.,
Feb. 27th, 1866.

MESSRS. O. P. DRAKE & CO.:

GENTLEMEN: I write you to say we have now had a fair trial of your gas machine, having used it, with three hundred lights, since December last; and I have pleasure in reporting that it has given us complete satisfaction in all respects. I have used the oil-gas and find yours much cheaper, and attended with much less trouble. Very respectfully yours,

ROBERT DOBSON, Supt.

From the Superintendent of the N. J. State Lunatic Asylum

STATE LUNATIC ASYLUM, TRENTON, N J.,
August 29th, 1866.

O. P. DRAKE & CO.: In reply to your inquiry as to the working of the three-hundred-light SOLAR GAS MACHINE, put up by you a this Institution in April last, I have to state that our expectations have been fully met in all respects. . . . The light is excellent in quality, and regular in supply. It has also proved to be economical. . . . I can cordially recommend the machine, etc., etc.

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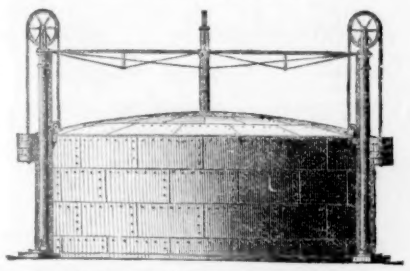

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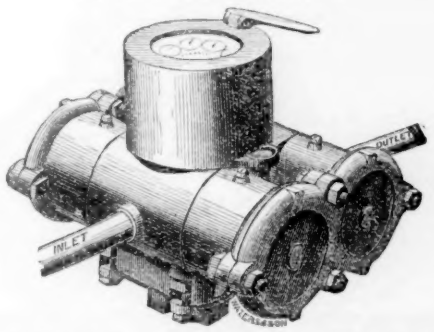

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BRYANT, CALLENDER & CO.,

EDITORS AND PROPRIETORS.

SATURDAY, NOVEMBER 2, 1867.

WISHING TO MAKE this Journal an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of those subjects a pleasure, or a profession.

SUBSCRIBERS would confer a favor upon us by remitting CHECKS or POST OFFICE MONEY ORDERS, as we are frequent losers where money is enclosed in letters.

☞ NEWS AGENCY.—The American News Company, 119 and 121 Nassau street, New York, are agents for this Journal. Newsdealers will please send orders to them.

CONTENTS OF NO 9.

Stanley's Hydraulic Main.. 129
American Minerals at the Exposition.. 129
Haskins' Pat. Gas Furnace. 129
Advantages of Gas.. 130
Sensitive Flames.. 130
New Process for Reducing Ores.. 130
Brevities.. 130
History of Illuminating Gas 131
Titaniferous Sand.. 131
Useful Recipes.. 131
Chemical Products from the Distillation of Peat.. 132
The New Electro-magnetic Light.. 132
Petroleum Fuel for a Dummy Locomotive.. 132
Source of Salt in the Sea.. 132
Philadelphia Public Park and Water Supply.. 133
Quickened Production of Cast Steel.. 133
GENERAL SUMMARY—
Closing of the American Institute Fair.. 133
Concerning Gas.. 133
New Use for Petroleum.. 133
New Discoveries of Copper.. 133
New Water Main.. 133
Boats of Paper Mache.. 133
A Humboldt County Mine.. 133
Mining Share Market.. 134
PATENT CLAIMS.. 134
Theory of Steel.. 134
Answers to Correspondents. 136
EDITORIALS—
New Theory of Chemical Force and Electricity.. 136
Fair of the Am. Institute—Plastic Slate Roofing.. 136
New Feature in Gasometers.. 137
Enterprise East and West 137
Gas-Works in the U. S. Court.. 137
New Gas Stove, Furnace, etc.. 137
Gas-Works For Sale.. 137
The Eureka Brick Machine. 144

Answers To Correspondents.

A. L. OF CAL.—Hydrogen gas may be obtained by diluting 3 lbs. oil vitriol with 24 pounds of water, and dissolve in it 2 lbs. of zinc. Place the ingredients in a tight glass or lead vessel, and a pipe to convey the gas to the balloon or receiver.

N. A. P., OF CONN.—Hilton's cement will fasten porcelain or glass when broken, but will not endure very hot water. A good cement may be made by mixing with white lead ground in oil as used for paint, red lead, so as to make a paste like putty. It requires about ten days to harden.

A. T. L. OF IND.—Inertion is the resistence offered by matter to any change either in the velocity or direction of motion. There is no such thing as *rest* in the universe, all matter is in motion.

P. T. OF TENN.—Skimmed milk applied to drawings will preserve them. To give paper an appearance of age, use a decoction of coffee.

L. B. OF N. Y.—An alloy of irridium and osmium is used to point gold pens. The alloy is known as irridosmium.

N. O. OF VT.—Iron can be welded at about 12,000 or 13,400 degrees. The melting point of cast-iron is from 17,000 to 20,000 degrees.

—The working of the potato-digging machine invented by S. B. Conovor of New York city, as described by the San Francisco *Mining Press*, is completely under the control of the driver, and the shovel-plow can be set to work at any required depth, or raised out of the ground so as to clear any obstructions, such as rocks or stumps. It is claimed that this machine will take out from 300 to 400 barrels of potatoes per day, and leave them clean and on the top of the ground ready to be gathered up.

NEW THEORY OF CHEMICAL HEAT AND ELECTRICITY.

Professor SEELEY, at a late meeting of the Lyceum of Natural History, unfolded some outlines of his new theory of the development of chemical force in the forms of heat and electricity. Professor Seeley's suggestions have been received with favor by many of our most judicious physicists, and it is to be hoped will command, in the scientific world at large, the careful consideration and testing which their importance demands, and which alone can determine their value. We make out the following version of his views:

The several degrees of heat produced by the leading chemical combinations have been recorded in grammes of water raised from 1° to 2° Centigrade in temperature. These results Professor Seeley supposes to represent the chemical potencies of the elements concerned, as exerted in the act of combination, and developed thereby in the form of heat or electricity according to circumstances. From a series of these results in which any one factor occurs repeatedly, it is easy to calculate the distinctive potency of each element. The results obtained from existing experimental data are not, however, altogether consistent with each other; oxygen, for instance, appearing to exert different potencies in combining with different elements; and the data are not sufficient or exact enough to determine positively whether this variation is real, or whether, as supposed, each element has its fixed and invariable potency. Investigations directed by the new hypothesis will be necessary in order to shape it as well as to verify it.

A single important point is made evident in the outset. The motion in the two elements which terminates in their union, and is thereby converted into heat-motion, is not caused by gravitation or any form of force working after the same laws; otherwise, the combining force or momentum of each element would be the same. The force, or rather activity, in matter, which we call chemical affinity, must be in some unexplained mode of motion as the antecedent to the heat mode in which it reappears at its termination. There are some grounds for a conjecture that it may be identical with electricity, or at least that electricity may be a next and immediate form which it takes before evolving sensibly as heat. The galvanic battery, examined in the light of this idea, not only illustrates this, but developes the hypothesis into a startling extension.

Thus, when pure zinc is exposed to hydrochloric acid, no reaction takes place, because the affinity of the zinc for the chlorine is not strong enough, in common language, to overcome that of the hydrogen for the chlorine, and dissolve the union between the latter elements. On immersing a piece of platinum in the same solution, with the zinc, the two metals being connected by a wire, an energetic reaction immediately takes place, hydrogen and heat appearing actively at the platinum pole, and chloride of zinc quietly accumulating at the other; while the energy that passes off in heat and active hydrogen if intercepted in the wire by a conductor and drawn off (as it may be partially), appears as electricity. This has been a mystery, of which no theory has been found having support in the facts. The fundamental principle of the new theory—which is nothing, after all, but a new application of the established law of the correlation, conversion and conservation of forces—lets the light directly into the heart of this mysterious phenomenon. Assuming that the chemical force, when its chemical action has terminated, does not subside but goes onward in some other form of motion, leaving the elements in which it had acted, it follows that those elements, in their combination, are divested of chemical potency so far, and that a restoration of such potency must be one condition of their resuming their active condition and proper quality. In case of the decomposition of hydrochloric acid by zinc, the metal must expend its potency in moving the chlorine to itself, and the latter motion when terminated must pass *in another form* into the freed hydrogen, to repotentize it for its active and separate condition. Unaided, the zinc potency appears to exert an insufficient attraction upon the chlorine, while the platinum plate makes a feeble pull upon the hydrogen. The two elements are ready to part under these forces, but do not, until a conductor of force is interposed between the two metals; when the passage of force from the zinc—or rather, as presupposed by the fundamental principle, the passage of the converted motion resultant from that which brings the chlorine to the zinc—exhibits itself in a beautiful and twofold form. First in the immediate potentization and evolution of hydrogen gas at the platinum pole, requiring for its gaseous expansion a portion of heat, and also accompanied by a considerable excess of heat. Second, by the interception of this excess of heat, and possibly (which can easily be ascertained) of that to which the hydrogen owes its expansion, when a conductor is applied to the wire between the two metals. The excess of force not absorbed by the hydrogen is thus intercepted in its passage before it takes the form of heat, and appears in the form of electricity; the measure of which is observed to be in striking conformity with the excess of power (measured in units of resultant heat) exerted in the formation of chloride of zinc, over that exerted in the formation of hydrochloric acid. Thus it seems as if force in matter produced these three modes of motion in the following order: 1st. Chemical; 2d. Electrical; 3d. Calorical; the intermediate or electrical mode not appearing ordinarily, but only when the chemical motion is not converted into calorical, and has to pass to its ojbect (in an intermediate transformation) through a conductor.

FAIR OF THE AMERICAN INSTITUTE.

PLASTIC SLATE ROOFING.

At the right, on the second tier, as the observer entered the main entrance of the late fair, the eye was arrested by a very pretty model of a gothic cottage in miniature, under a glass case. The most attractive feature of this house is the roof, which is covered with *one piece of slate* in all its different shapes, gables and angles. Not a crack, crevice or break can be detected, but apparently one solid seamless slab or sheet of slate, bearing a highly polished surface throughout, has been made to conform in some mysterious manner to the sharp angles and inequalities of the roof so as to bid defiance to the *elements*. We *italicize* the word elements, because this roofing protects buildings upon which it is placed not only from the ordinary atmospheric changes, but from fire also. It is impenetrable to storm, wind, hail, snow, rain and steam even; but the storm of fire, which in many instances it has been subjected to by the conflagration of adjacent buildings, has not been able to penetrate it, thereby saving to the lucky patrons of Plastic Slate Roofing many thousands of dollars, besides preventing its spreading further in its destructive march.

This roofing is a new article of manufacture, arising from the discovery made by its inventor, Mr. W. L. Potter, whereby certain combinations of cheap and well-known ingredients produce a substance having new properties somewhat perhaps as india-rubber

and sulpher combine to form an article of entirely unexpected qualities, and, like it, capable of being employed for a variety of useful purposes, and it most likely will give rise to many other new branches of industry. It is now used not only for roofing, but for pavements, flooring to sub-cellars, etc. to keep out moisture, and as a cement for pipes, tiles, drains, cisterns, etc. It is used to make artificial slates, and instead of blackboards for schools. It is capable of being converted into utensils of various kinds to resist the action of acids and alkalies. We have seen an inkstand of this material, equal to, and resembling Wedgewood's ware. If it can be made to take different bright colors, it is likely to be used for tessellated pavement, and as terra-cotta ware and the like.

As a roofing alone, it is superior on every account to anything we know. The samples at the Fair were exhibited by Edward Van Orden & Co., 41 Liberty-street, New York, who are the lessees for New York of the Plastic Slate Joint Stock Company, 157 Broadway. This company have not been in operation but a short time, yet we understand from their gentlemanly and efficient secretary and treasurer, Mr. J. M. Allen, that the company are about to declare a dividend.

NEW FEATURE IN GASOMETERS.

We lately had the pleasure of seeing the new large tank and gasometer being erected by the Brooklyn Gas-Light Company, and were interested in the new method being adopted of suspending the great telescopic holders, invented by the enterprising and progressive superintendent, Mr. A. F. Havens.

Instead of suspending the two sections as usual, with distinct sets of pulleys and a system of leading chains, with special ways for extra weights, Mr. Havens has two pulleys or rollers to each pillar, running upon one journal. These rollers are of two sizes, one large and one small, and grooved to receive the chains. The larger groove or circumference takes the chain from the upper section of the gasometer, while the smaller circumference takes the chains of the lower section, The columns are hollow and cast with ornamental open work, and the weights move up and down within them.

The weight of the lower section is suspended so as to be above the weight of the upper section, this uppermost weight having a slot cut in it to let the chain of the upper section pass freely through it. When the upper section rises the chain of the large wheel lets the weight descend in the columns, until the lower section locks with the upper section, where both sections ascend together, while the weights both descend simultaneously from that point. When the gasometer descends the weights ascend, till the lower section touches, when the lower weight continue to rise until the upper section of the holder is down.

This method seems to be much more simple, cheaper, and, we should think, more efficient than the cumbrous and complicated method now in use to suspend telescopic gasometers.

ENTERPRISE EAST AND WEST.

The cosmopolitan character of this Journal is apparent when we consider the advertisements it contains, and the remote distances from this city and from each other where many of the enterprising patrons, and subscribers, are located. Boston, St. Louis, Chicago, Pittsburgh, Philadelphia, New Orleans, Baltimore, Louisville and Cincinnati, are some of them.

Among the recent enterprising advertisers in the three last named cities, may be mentioned Mr. B. S. Benson, of Baltimore, also Mr. Dennis Long, of Louisville, T. G. Gaylord, of Cincinnati, all well known and extensive manufacturers of the various gas apparatus, gas and water pipes, retorts, oil, mining, railroad castings, etc., which the constantly and rapidly increasing demands of the entire country call for. In this progressive and luxurious country and age, the conveniences and comfort of gas-light, and plenty of it, and also of pure water, and without stint, in all our growing cities and towns, is a *sine qua non*; so much so that "midnight lamps," "tallow dips," and "town pumps" and "the moss covered bucket" of the olden time are remembered only as a matter of history, or in the poetical language descriptive of a past and passing generation, which to memory is rendered more enchanting by the distance, and in sentiment more beautiful in song.

The conveniences of light, heat, ventilation and water, as applied and enjoyed at an earlier day in our large seaboard cities and towns are at the present time quite as fully appreciated, and are being as extensively adopted by the denizens of the numberless cities and towns of the west and south. Hence we see these new and extensive manufactures spring up, to supply partly the rapidly increasing demands for the various apparatus and appliances which, a few years ago, were mostly supplied by our eastern establishments, such as Messrs. Herring & Floyd and Joseph Nason & Co, of New York, and Messrs. Morris, Taskar & Co., and Merrick & Sons, of Philadelphia, etc., but the increasing demand at home and abroad became so large that the great law of supply and demand gave rise to those of the great West. We shall speak of these several industries as developed and developing both at the east and the west more in detail hereafter.

GAS-WORKS IN THE U. S. COURT.

As we foretold, the first decision in this contest between the city of Cincinnati and the Cincinnati Gas-Light and Coke Company, has been adverse to the city.

Concisely the case is as follows:

The city having elected to purchase the gas works, as it was entitled to do at the expiration of twenty five years from the original grant, proceeded to appoint Miles Greenwood and Henry Kessler as appraisers, and the gas company elected two disinterested persons as arbitrators, non-residents; and these four were authorized, but have, thus far, failed to appoint a fifth, the two arbitrators appointed by the city insisting that the fifth shall be like themselves, a Cincinnati tax-payer and gas-consumer. To this the gas company objected, and hence the delay in the appointment. Pending the settlement, the City Council pass an ordnance regulating the price of gas, and compelling the company to supply it at $2 per thousand cubic feet, and this price, the company avers, is not sufficient to cover the cost of its production.

At this stage of the proceedings, one Mrs. Sophia C. Deane, a non-resident, holding some $84,000 worth of stock in said company, files a bill asking the Court to interpose to enjoin the Directors of the Gas Company not to assent to the purchase of the works by the city under these conditions, averring that the arbitrators appointed by the city are not, as the charter says they should be, "disinterested persons," and praying the Court to interfere and enforce a specific performance of the contract. A demurrer to this bill was filed, on behalf of the city, which was in general to the effect that it was a matter in which a Court of Equity could not interfere; and that the complainant's remedy lay with the Directors of the Company. This was agreed by Judge Gholson, on the part of the city, and Mr. A. F. Perry, on the part of the complainant; the decision of Court was rendered in favor of the complainant.

His Honor Judge Swayne held that the charter of the Cincinnati Gas-light and Coke Company determined and fixed its rights, and that the stockholders invested their money in the company with full faith in its provisions. The charter required that in the event of the city's purchasing the Gas Works, it should appoint two *disinterested* persons as appraisers. It was averred that the two appointed by the city of Cincinnati were tax-payers and gas-consumers, and that they would have to contribute to the fund for the purchase of the works when that purchase was consummated. There was no room for doubt in the mind of the Court that they were not "disinterested appraisers" or arbitrators. Personally there could be no objection to the two appraisers appointed by the city, but the course of justice would not flow smoothly if their appointment were assented to. The light of reason, common sense, and the authorities were all against it.

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The great *desideratum* in heating our dwellings and cooking our fuel is to have a *gas fuel*, provided it can be employed without the objections which have always existed in its use to a greater or less extent—namely, expensiveness, disagreeable odor, and injury to the health.

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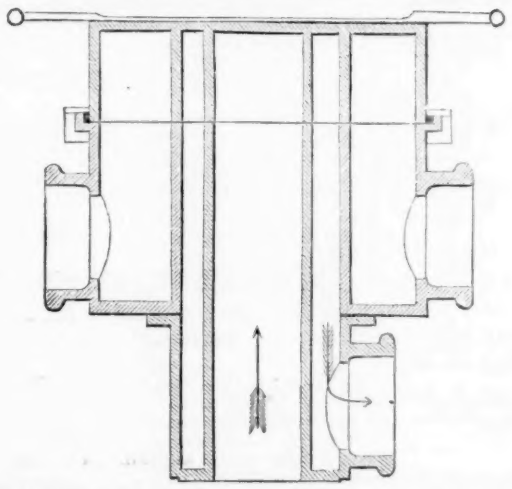

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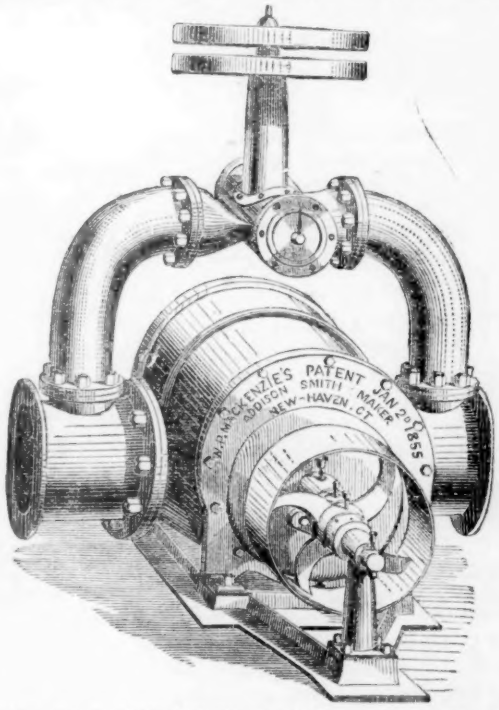

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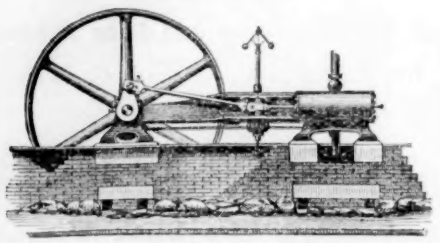

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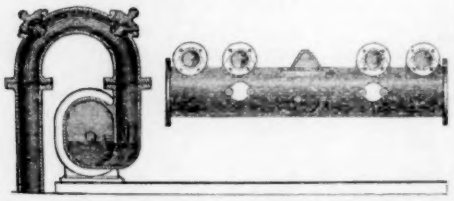

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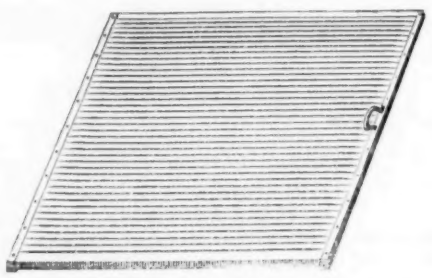

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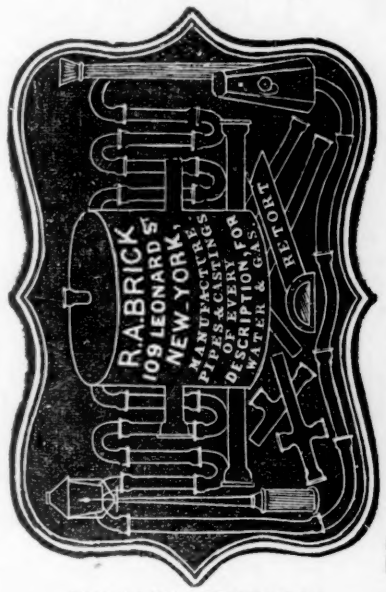

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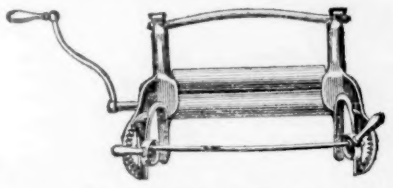

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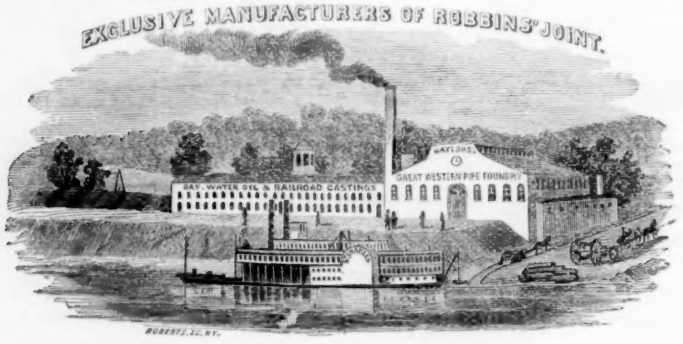

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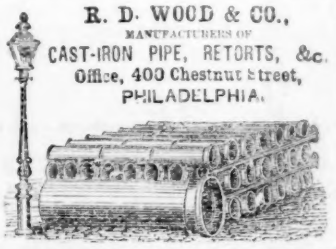

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Any one sending us orders for two machines shall receive one machine free of charge. This proposition cannot avail after we have appointed a local agent in the town.

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Great Impovrement

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This Machine is constructed on entirely new principles of mechanism, possessing many rare and valuable improvements, having been examined by the most profound experts, and pronounced to be SIMPLICITY and PERFECTION COMBINED.

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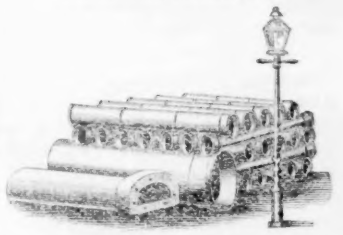

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The Eureka Brick Machine.

The accompanying illustration exhibits a highly valuable invention, for which Mr. H. B. Reeve, 141 Broadway, is the general agent for the United States. Very many designs have recently been presented, but none appear to possess anything like the advantages or simplicity of this machine. Considering the cost of materials for building purposes, we should judge that those who are producers of brick will at once avail themselves of this device. Its construction is simple yet powerful, and if we are rightly informed, reasonable in cost. The machine is expeditious and almost automatic, and requires but little power and no great amount of judgment to work the same. The inventor claims the following advantages:

First—The tempering apparatus is perfect, and by soaking the clay over night in a water tight pit the machine will mill the clay splendidly and easily make 3,000 beautiful bricks per hour, with only nine hands and one pair of horses, or will make 4,320 per hour by steam. In fact the capacity for making bricks is only limited by the facility you have for off-bearing them.

Second—There is a self-acting steel spring on the top of the lever on the side of the machine, so that if in putting in a mold into the machine it should get foul the spring flies back and ungears the machine and prevents the breaking of the mold. This feature (the patent of which belongs to the Eureka,) is a grand one, and will save a great deal of labor to the operator.

Third—The press is double acting, and it remains on the mold until delivered on the platform by the side lever, hence the molds are always well filled, bricks perfectly pressed, and have straight and well defined edges.

Fourth—In case a stone, stick, or other obstruction gets into the press box, by bearing down on front lever the box instantly opens, the clod cutter may be taken out, the impediment removed, and the clod cutter replaced, and the machine started in motion in less than one minute by the watch.

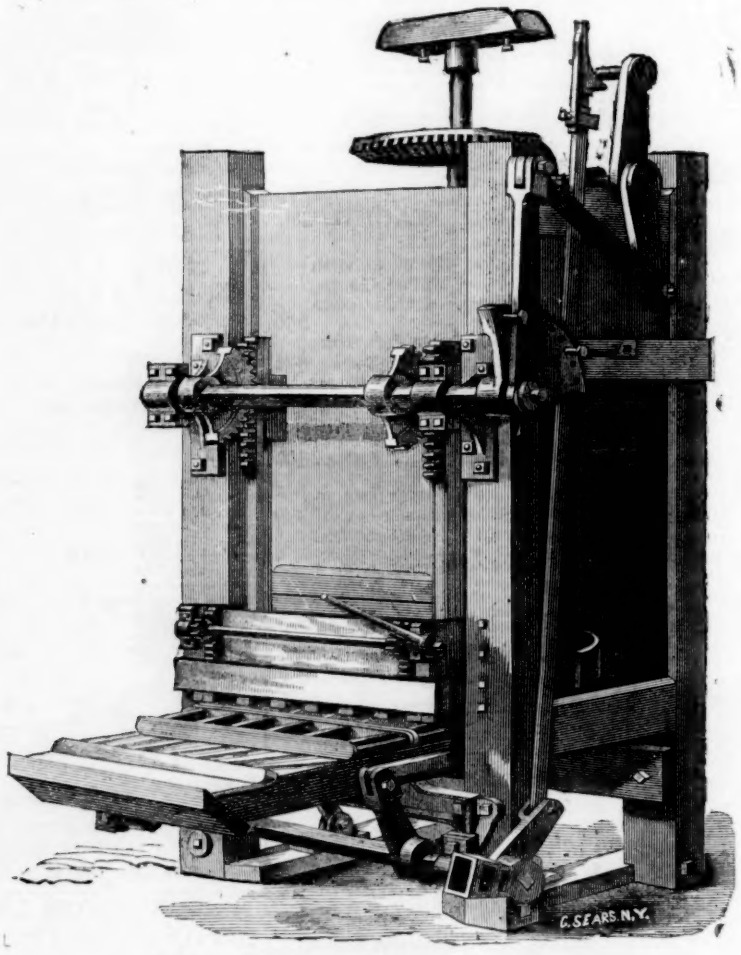
Fifth—Every appointment of the Eureka is perfect, and the whole machine so substantially built, that with care it may run the whole season without laying out one dollar of expense in the way of repairs.

Sixth—Guarantee of satisfaction is given to every purchaser.

Seventh—The bricks made by the Eureka are not dry pressed, but are warranted to stand any climate and all weathers, whilst those made by the dry pressing machines all crumble to atoms on being exposed to the frost.

Size, eight feet high, four feet diameter. Weight, including moulds and trucks, about 4,000 lbs. It tempers the clay perfectly, and delivers the moulds on the platform.

The irons are numbered and lettered, so that the purchaser cannot mistake in putting it together. As a self-worker to temper, mould and deliver, it has no equal.



THE EUREKA BRICK MACHINE.

A pamphlet, giving full instructions in detail, for making, taking care of, and burning brick, will be furnished gratis to all buyers of machines.

Advertising Index.

GAS-BURNERS, APPARATUS, ETC.

American Meter Company, 512 West 22d street, New York... 142
Automatic Gas Purifier—State Rights for sale—Wm. C. Turnbull, care of T. C. Babcock, 59 Broadway, or office of the American Gas-Light Journal 141
Castings, Station Meters, &c.—Wilmington (Del.) Gas Company; G. Richardson, President 140
Cast Iron Pipes and Fittings—B. S. Benson, 52 East Monument street, Baltimore, Md... 134
Glycerin for Wet Gas Meters—Hartmann & Laist, Cincinnati, Ohio, or L. Bruckmann, 67 Wall street, New York... 140
Gasoleine,—J. W. Wheelock, 284 Pearl st., New York 138
Gas Cooking Stoves—Dr. Musgrave, 138 West Sixth st. Cin., O. 135
Gas Coals—Bird, Perkins & Job, 104 Wall street, New York... 138
Gas Engineers and Contractors—Hoy, Kennedy & Co., 111 Liberty street, New York 138
Gas-Burners—C. Gefrorer, 529 Commerce street, Philadelphia, Pa..... 143
Gas Meter Manufacturers—Harris & Bro., 1117 Cherry street, Philadelphia, Pa..... 142
Gas Superintendent—C. M. Cresson, 417 Walnut st., Phil., Pa.. 143
Gas Apparatus, &c.—Geo. H. Kitchen & Co., 561 Broadway.. 143
Gas Burners—Wightman Bros., 25 Kilby st., Boston, Mass.... 143
Gas Burner—T. G. Arnold, 221 and 226 West 21st st., N. Y.. 143
Gas Burners—W. Anderson, cor Franklin & Elm sts., N. Y.... 134
Gas Works Fixtures for Sale—Brookline (Mass.) Gas Co..... 134
Gas Works for Sale—Colonel A. J. Caubaton, Manhattan Gas Works, N. Y.. 137
Plumbers, Gas and Steam Fitters—Moore & Gaussen, 221 West Fifth street, Cincinnati, O..... 138
Patent Gas Exhauster—Smith & Sayre, 484 Broadway..... 139
Patent Dry Centre Valve—American Meter Company, 512 West 22d street, New York 139
Purifying Trays—Jno. L. Cheeseman, 147 and 149 Ave. C, N.Y. 140
Retorts, Pipes, &c.—R. D. Wood & Co., 400 Chestnut street, Philadelphia..... 143
Street Lamps—J. G. Miner, Morrisania, Westchester Co., N.Y. 135
Solar Gas Machines—Smith & Drake, 726 Broadway..... 135
Wet and Dry Gas Meters, etc.—Joseph Lennig, 1615, 1617 and 1619 Francis street, Philadelphia, Pa..... 145

FOUNDRIES.

Bergen Iron Works—Driving Pipes and Bands—R. A. Brick, 109 Leonard street, N. Y. 141
Columbian Iron Works—Wm. Taylor & Sons, 11, 13 and 15 Adams street, Brooklyn, N. Y..... 140
Dealers in Iron, Copper, Brass, etc.—T. Cassidy & Co., corner of Bridge and John streets, Brooklyn, N. Y..... 138
Erie Basin Iron Works—Elizabeth, Dwight and Van Dyke sts., South Brooklyn, N. Y..... 103, 140
Gaylord's Great Western Pipe Foundry—Office 90 and 92 Broadway, Cincinnati, Ohio..... 142
Manufacturing Enamelers—Nessle & Taylor, 97 Water street, Brooklyn, N. Y..... 138
National Foundry and Pipe Works—Wm. Smith, Carroll, Pike, Smallman and Wilkins streets, Pittsburgh, Pa 140
Oregon Iron Foundry—Herring & Floyd, 738, 740, 742 and 744 Greenwich street, New York..... 140
Pascal Iron Works—Morris, Taskar & Co., Philadelphia, Pa... 143
Situation Wanted as Assistant Manager of Gas Works..... 141
Second-Hand Purifiers Wanted—Apply at office of this paper.. 140
Southwark Foundry—Merrick & Sons, Fifth and Washington streets, Philadelphia..... 143
Wrought Iron Pipes, etc.—Joseph Nason & Co., 61 Beekman street, New York..... 138

WATER METERS, PUMPS, ETC.

Aubin Water Meter—H. Q. Hawley, Albany, N. Y..... 138, 143
Babcock & Wilcox's Stationary Steam Engines 134
Davis' Steam Superheating Boiler—Duplex Steam Boiler Mf'g Company, Long Island City, N. Y..... 134
Gaylord's Patent Couplings—Gaylord Patent Coupling Co., 31 and 33 Dey street, N. Y..... 134
Putnam's Clothes Wringer—Putnam Mf'g Co., 13 Platt street, New York..... 141
Pat. Lead-Encased Tin Pipes—Colwells, Shaw & Willard, foot of West 27th street, N. Y..... 113
Steam Engines—Wm. Elting, 65 Liberty street, New York... 138
Steam Pumps—H. R. Worthington, 61 Beekman st. New York. 140
Steam Engines and Boilers—John B. Fuller, 47 Dey st., N. Y... 121
Water Pipes, etc.—S. Fulton & Co. 207 North Water st. Phila... 143
Water Closets, etc.—Wm. S. Carr & Co. 149, 151, 153, 155, 157 Centre street, New York..... 138
Water and Sewerage Pipes—Am. Water and Gas Pipe Company northwest corner of Green and Bay sts., Jersey City, N. J... 139
Worthington's Water Meters—H. R. Worthington, 61 Beekman street, New York 135
Woodward Steam Pump Mf'g Co. 76, 78 Centre st. New York. 143

CLAY RETORT WORKS.

Bay State Clay Retort Works, 125, 127 Water st. Boston, Mass. 140
Brooklyn Clay Retort Works, Van Dyke st. Brooklyn, N. Y.... 139
Clay Retorts, Tiles, etc.—J. H. Gautier & Co. Jersey City, N. J. 139
Louisville Pipe Works—Dennis Long, Cor. 9th and Water-sts., Louisville, Ky..... 127
Laclede Fire Brick Works, 1007 North Levee, St. Louis, Mo.... 138
Manhattan Clay Retort Works, 15th st. near Av. C, New York.. 129
New York " " 56 Goerck street, New York... 139
Philadelphia Fire Brick Works, Vine and 23d sts. Philadelphia. 139

MINING MACHINERY, ETC.

Broker in Mining Stocks—C. H. Smith 51½ Pine st. New York.. 138
Industrial Chemistry—Prof. H. Dussauce, New Lebanon, N. Y. 135
Mining Engineer—J. H. Tiemann, 240 Pearl st. New York..... 138
Mining Machinery—A. Hitchcock, 4, 6, Pine st., New York.... 138
Notice to Mining Companies—Eng. and Supt. Richmond, Va.. 140
Sodium Amalgam &c.—Prof. Wurtz, 26 Pine st., New York..... 138
Washington Mill and Sil. Mining Co. 30 " " 140
School of Mines, Columbia College, East 49th st. " 135

LAMPS, STOVES, PETROLEUM, ETC.

Eddy's Kerosene Cooking Stoves—Alex. M. Lesley, 605 6th av.. 141
Lamps—F. H. Lovell & Co 233 Pearl street, New York..... 141
Paraffine Oil—G. H. Bronson, 132 Maiden Lane New York..... 138
Chimney Top—C. H. Reichmann, 45 Fulton st " 141

MISCELLANEOUS.

Books—D. Van Nostrand, 192 Broadway.. .... 138, 141
Dalton Knitting Machine Company, 537 Broadway..... 141
Empire S. S. Line for Savannah, Garrison & Allen, 5 Bowling Green..... 143
Empire Shuttle Machine—T. J. McArthur, 536 Broadway..... 143
Fire Extinguisher—U. S. Fire Extinguisher Co., 8 Dey street.. 140
Finkle & Lyon Sewing Machine Company, 581 Broadway..... 143
Hair Rejuvenator—J. S. Pearson & Co., 286 Jay st., Brooklyn. 134
Opposition S. S. Line to California—177 West st., cor. Warren.. 143
Prince's Metallic Paint—D. Sloan & Co. 115 Liberty street.... 139
Plastic Slate Roofing Co. 157 Broadway..... 141
Pianos—Grovestein & Co. 499 Broadway..... 142
Roofing Materials—E. Van Orden & Co. 41 Liberty st..... 138
Rubber Goods—O. B. Gray, 201 Broadway 138
Ventilation—Henry A. Gouge, 254 Broadway 135
Watches—T. B. Bynner 189 Broadway..... 135
Weed Sewing Machine Company, 506 Broadway..... 141

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